

WHAT IS CLAIMED IS:

1. An active matrix LCD panel for use in an active matrix LCD device comprising a transparent insulating substrate, a plurality of pixels arranged on said transparent insulating substrate and each including a pixel electrode and an associated TFT, and a passivation layer covering said plurality of pixels, said TFT having a gate electrode including a transparent conductive film and a metallic film consecutively formed on said transparent insulating substrate, a gate insulating film covering said gate electrode, an island amorphous silicon (a-Si) layer formed on said gate insulating film, and source and drain electrodes, said passivation layer covering side surface and top surface of said a-Si layer and having openings therein, said source and drain electrodes being in contact with said a-Si layer through the respective openings of said passivation layer, said pixel electrode including a transparent conductive film formed in a common layer with said transparent conductive film of said gate electrode, said source electrode being in contact with said transparent conductive film of said pixel electrode through the opening of said passivation layer.

2. The active matrix LCD panel as defined in claim 1, wherein a gate storage electrode formed in a common layer with said source and drain electrodes, said passivation layer and an

5 electrode formed in common with said gate electrode constitute a gate storage capacitor.

3. The active matrix LCD panel as defined in claim 1, wherein said a-Si layer has a shape substantially same as a shape of said gate insulating film as viewed in perpendicular to a surface of said transparent insulating substrate.

4. The active matrix LCD panel as defined in claim 1, wherein said active matrix LCD panel is used in a TN-mode LCD device.

5. The active matrix LCD panel as defined in claim 1, wherein portions of said a-Si layer in contact with said source and drain electrodes are heavily doped regions.

5 6. An active matrix LCD panel for use in an active matrix LCD device comprising a transparent insulating substrate, a plurality of pixels arranged on said transparent insulating substrate and each including a pixel electrode, a counter electrode, and an associated TFT, and a passivation layer covering said plurality of pixels, said TFT having a gate electrode including a transparent conductive film and a metallic film consecutively formed on said transparent insulating substrate, a gate insulating film covering said gate electrode, an island amorphous silicon (a-

- 10 Si) layer formed on said gate insulating film, and source and drain electrodes, said passivation layer covering side surface and top surface of said a-Si layer and having openings therein, said source and drain electrodes being in contact with said a-Si layer through the respective openings of said passivation layer, said counter
- 15 electrode including a transparent conductive film formed in a common layer with said transparent conductive film of said gate electrode, said source electrode being in contact with said transparent conductive film of said pixel electrode through the opening of said passivation layer.

7. The active matrix LCD panel as defined in claim 6, wherein portions of said a-Si layer in contact with said source and drain electrodes are heavily doped regions.

8. The active matrix LCD panel as defined in claim 6, wherein said passivation layer includes a silicon nitride film and an overlying organic dielectric film.

9. The active matrix LCD panel as defined in claim 6, wherein said organic dielectric film includes at least one of acrylic resin, benzocyclobutene, and polyimide.

10. The active matrix LCD panel as defined in claim 6, wherein said passivation layer includes a silicon nitride film and

an overlying silicon oxide film.

11. The active matrix LCD panel as defined in claim 1, wherein said drain electrode has a top surface oxidized.

12. A method for manufacturing an active matrix LCD panel comprising the consecutive steps of:

depositing consecutively a transparent conductive film and a metallic film thereon, and selectively etching the transparent conductive film and the metallic film by a first photolithographic step using a first mask pattern to form gate electrodes and pixel electrodes;

depositing consecutively a gate insulating film and an a-Si layer thereon, and selectively etching the gate insulating film and the a-Si layer by a second photolithographic step using a second mask pattern to form island a-Si layers and gate insulating films;

depositing a passivation film thereon to cover top and side surfaces of the island a-Si layers, and selectively etching the passivation film by a third photolithographic step using a third mask pattern to form openings therein for exposing portions of the island a-Si layers and the pixel electrodes; and

depositing a source/drain electrode film thereon, and selectively etching the source/drain electrode film by a fourth photolithographic step using a third mask pattern to form source/drain electrodes in contact with the portions of the island

a-Si layers and the pixel electrodes.

13. The method as defined in claim 12, wherein the electrode film includes another a-Si layer doped with impurities and an overlying metallic film.

14. The method as defined in claim 12, further comprising the step of doping the island a-Si layer with impurities through the openings of the passivation film.

15. The method as defined in claim 12, wherein the passivation layer includes a silicon nitride film and an overlying organic dielectric film.

16. The method as defined in claim 15, wherein said organic insulating film includes at least one of acrylic resin, benzocyclobutene, and polyimide.

17. The method as defined in claim 12, wherein said passivation layer includes a silicon nitride film and an overlying silicon oxide film.

18. A method for manufacturing an active matrix LCD panel comprising the consecutive steps of:

depositing consecutively a transparent conductive film and

5. a metallic film thereon, and selectively etching the transparent
conductive film and the metallic film by a first photolithographic
step using a first mask pattern to form gate electrodes and counter
electrodes;

10 depositing consecutively a gate insulating film and an a-Si
layer thereon, and selectively etching the gate insulating film and
the a-Si layer by a second photolithographic step using a second
mask pattern to form island a-Si layers and gate insulating films;

15 depositing a passivation film thereon to cover top and side
surfaces of the island a-Si layers, and selectively etching the
passivation film by a third photolithographic step using a third
mask pattern to form openings therein for exposing portions of
the island a-Si layers; and

20 depositing an electrode film thereon, and selectively
etching the electrode film by a fourth photolithographic step using
a third mask pattern to form source/drain electrodes in contact
with the portions of the island a-Si layers and to form pixel
electrodes.

19. The method as defined in claim 18, wherein the electrode
film includes another a-Si layer doped with impurities and an
overlying metallic film.

20. The method as defined in claim 18, further comprising the
step of doping the island a-Si layer with impurities through the

openings of the passivation film.

21. The method as defined in claim 18, wherein the passivation layer includes a silicon nitride film and an overlying organic dielectric film.

22. The method as defined in claim 18, wherein said organic insulating film includes at least one of acrylic resin, benzocyclobutene, and polyimide.

23. The method as defined in claim 18, wherein said passivation layer includes a silicon nitride film and an overlying silicon oxide film.